California Regional Water Quality Control Board

Central Valley Region

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TO:	Russell W. Walls Senior Engineer	**FROM:**	Alan Cregan Engineering Geologist
DATE:	22 May 2006	**SIGNATURE:**	_____

SUBJECT: RESPONSE TO REVIEW OF IRRIGATION SEASON SEMI-ANNUAL MONITORING REPORT – SOUTHERN SAN JOAQUIN VALLEY WATER QUALITY COALITION – KAWEAH RIVER SUB-WATERSHED

Staff Review

The Irrigation Season Semi-Annual Monitoring Report (SAMR) for the Southern San Joaquin Valley Water Quality Coalition's (SSJVWQC) Kaweah River Sub-watershed was submitted to the Sacramento Office of the Central Valley Regional Water Quality Control Board (Central Valley Water Board) on 28 February 2006. This report was submitted by the Kaweah River Sub-watershed to meet the requirements of Resolution R5-2003-0105 and the associated Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands (Conditional Waiver) adopted by the Central Valley Water Board on 11 July 2003.

Central Valley Water Board staff has reviewed the SAMR to evaluate the document for the required monitoring and reporting conditions detailed in Monitoring and Reporting Program Orders No. R5-2003-0826 and No. R5-2005-0833, the conditions set forth in the Kaweah River Sub-watershed's Monitoring and Reporting Program Plan (MRP Plan), the Quality Assurance Project Plan (QAPP), and to assess the quality of the data generated and the conclusions and recommendations presented.

The following SAMR review has been broken into three categories: 1) data quality, 2) data interpretation, and 3) compliance with the Conditional Waiver requirements.

DATA QUALITY

Item 1: Field data sheets are not included in the report. The Sub-watersheds contract laboratory, Fruit Growers Laboratories (FGL) own guidelines specify that, *"All field sampling logs (if applicable) and chain of custodies should be given to sample receiving. The original*

copy of the field logs and chain of custody are returned to the client with the analytical reports. A copy of these documents are kept in the client file."

Problems with FGL's field data deficiencies were identified during the Central Valley Water Board staff review of the Kaweah River Sub-watershed's 2004 Annual Monitoring Report. In response to staff's comments regarding this issue, the Sub-watershed stated that, *"The Association has directed FGL to enhance their field data reporting and comply with RWQCB directives to further assist in document and data interpretation efforts."* It is understood that because of the issue of timing between the receipt of staff comments and the dates of the 2005 sample collection, proposed changes to the sampling program may not have had sufficient time to be implemented. However, it must be stressed again that field data is an integral part of the sampling program. Inclusion of field data sheets is necessary to determine if sampling was accurate, complete, and performed in accordance with the requirements of the Conditional Waiver Program. The field-testing that was conducted for the Kaweah River Sub-watershed appears to have included estimates of surface-water flow (not direct measurements), dissolved oxygen (DO), and temperature. This is based on Table 1-5 and the discussion on page 4-1 within the Kaweah River Sub-watershed's SAMR. Order No. R5-2003-0826, Attachment A requires that field measurements, include:

- Flow
- pH
- Electrical conductivity
- Dissolved oxygen
- Temperature

Item 2: Chain of Custody (COC) documentation was insufficient and not legally sustainable. COC documents included in the SAMR varied with each sampling event. The most complete COC was done for the 6 July 2005 sampling event. This document specified times of collection and transfer, number of sample bottles, their size and type, preservatives added, analysis requested, and special instructions. It did not include required COC seals and did not specify running a TIE if mortality is equal to, greater than, 50%. The COCs for the 10 August 2005 and 20 November 2005 sampling events did not specify custody seals, number of bottles, transportation method (ice chest cooled to 4 degrees C), contained no special instructions, and included gaps in time and insufficient signatures to document an unbroken chain of custody. As described in the 2004 Annual Monitoring Report review, the COC needs to be performed in accordance with Attachment A of Resolution R5-2003-0826 pages 5 and 6.

Item 3: Laboratory data sheets (including bench sheets) were not included despite being listed in the contents of Section 5 (Analytical Methods page 5-1) of the SAMR. This deficiency was noted in staff's review of the 2004 AMR and remains an issue to be corrected. Information contained within the laboratory data sheets is especially important when questions arise regarding toxicity testing results. An example of this is the sediment toxicity testing conducted for sample SP-2 on 28 November 2005 (52.5% survival). The laboratory reported, "Potential predators were observed in this sample that may have contributed to the observed toxicity." The accompanying report shows that 8 of 40 *Hyalella azteca* died in the control and 19 of 40 died in the tested sediment. However, the laboratory

reports no statistically significant difference exists between the two populations. The problem may be with the statistical test that was utilized coupled with the small number of test replicates that were run. The number of test replicates strongly influences the results of the statistical testing. Aquatic Bioassay & Consulting uses the minimum (four) replicates for samples and controls. This number should be increased to eight to take into account possible variances due to mortality in the control group.

Regardless, if the laboratory quality control is inadequate, for whatever reason, the samples must be reanalyzed if they are still within their required holding times. If the holding times have elapsed, then the location must be resampled and analyzed in order to provide the quality of data necessary to make informed program decisions.

Item 4: Practical quantitation limits (PQLs) were not specified for samples analyzed prior to 5 August 2005. However, it should be noted that the PQLs used by FGL for various physical and chemical parameters would exceed the values set forth in the current Monitoring and Reporting Program Order No. R5-2005-0833 (PQLs too high for total dissolved solids, turbidity, Bromacil, Diazinon, Dimethoate, Molinate, Simazine, Thiobencarb, Glyphosate, Diuron, and Paraquat). Table 1 of Order No. R5-2005-0833 (page 7) lists the maximum PQL values that are currently in effect.

Item 5: Holding time was exceeded for all bacteria analysis and for the 21 February 2005 toxicity analysis (Selenastrum). Even with the exceeded holding time, total coliform bacteria values reported exceeded 2420 MPN/100 ml (most probable number per 100 milliliters). Additionally, a fecal coliform level of 2420 MPN/100ml was also reported in sample SP-3 collected on 6 July 2005. The fact that the bacteria levels were so high even though the holding times were exceeded may indicate an ongoing problem.

Item 6: Quality control (QC) samples did not include equipment blanks, field duplicates, matrix spikes, or matrix spike duplicates. Coalition Group MRP Order R5-2003-0826 requires that at a minimum, 5% equipment blanks and field duplicates must be analyzed. Order R5-2003-0826 further requires that matrix spikes and matrix spike duplicates be run at a rate of one pair per sample batch.

Item 7: A data quality problem was observed in the pesticide analysis report submitted by Fruit Growers laboratories (FGL). Laboratory control samples (LCS) were above their upper control limits. Because none of the affected compounds were detected in the sample, the laboratory took no further action and accepted the results. If the LCS recovery is outside of the laboratories own acceptance limits, the laboratory must take some action to correct the deficiency. In general, the laboratory control sample must be reprocessed when the LCS is outside of the acceptance limits.

Item 8: Sediment toxicity sampling results presented on Tables 1-7, 6-6, 6-7, 6-8, and 6-9 are incorrectly labeled as having been collected on 10 August 2005. Samples were actually collected on 20 November 2005.

Item 9: In a letter to the SSJVWQC (16 December 2005) the Central Valley Regional Water Quality Control Boards Executive Officer, Thomas Pinkos, required that, "*The next*

*monitoring report for the Southern San Joaquin Valley Water Quality Coalition (Coalition) is due **31 December 2005**. This report should represent all monitoring activities for 2004/2005 wet season that has not yet been submitted to the Central Valley Water Board, as well as all of 2005 irrigation season."* The results of storm-season water-column toxicity testing conducted on 21 February 2005 were presented in a Communication Report to the Central Valley Water Board on 17 May 2005. Total mortality was reported for Ceriodaphnia (sample SP-3) and statistically significant toxicity to Selenastrum was detected in the sample collected from the same location. Incomplete laboratory toxicity data was presented as part of the Communication Report: 1) toxicity data was not presented for Ceriodaphnia at site SP-4, 2) the cover sheet for the fathead minnow toxicity test at location SP-1 was missing, 3) an insufficient number of replicates was used for the fathead minnow testing (two replicates were used instead of the required four for receiving waters), 4) holding times were exceeded for Selenastrum (three days vs. the required 36 hours) and 5) raw laboratory data sheets were not included. The Communication Report states that a variety of follow-up issues were being pursued (TIE data, district meetings, potential source identification). No additional information has been reported to date and it is unknown if a dilution series and/or a TIE was performed.

DATA INTERPRETATION

Item 10: Pesticide application information is incomplete. Appendix A of the Kaweah River Sub-watersheds SAMR includes information on only three sections (25, 26, and 36) out of approximately 200 sections contained within the Sub-watershed. Additionally, the pesticide use database does not include the date that the restricted material was applied. This information is necessary to constructively utilize the database when pesticide detections occur.

The pesticide use section presented on page 6-2 of the SAMR contains the statement that, "*Specific information regarding crop types and pesticides use for the Kaweah River Sub-watershed has proven to be not readily available"*. It is unclear if this statement refers to all, or only part of the Sub-watershed. Water Board staff contacted Mr. Dave Greenwood of the Tulare County Agricultural Commissioners office regarding access to the relevant information. Mr. Greenwood stated that crop type and pesticide use within Tulare County is readily available from the Agricultural Commissioners office.

Item 11: A portion of the discussion regarding Table 6-4 in the Water Quality – Phase 1 section of the SAMR (page 6-6) reports on the results of turbidity levels above those specified in the Water Quality Control Plan for the Tulare Lake Basin (Basin Plan). The SAMR states, *"Turbidity did exceed its regulatory Maximum Contaminant Level (MCL) at all sample locations. Turbidity levels however, can be considered to be at such levels as to not cause adverse agricultural effects, which is consistent with Basin plan objectives."* The Basin Plan lists municipal and domestic supply, agricultural supply, industrial service supply, industrial process supply, water contact recreation, non-contact water recreation, wildlife habitat, and ground water recharge for the waters in the Kaweah River below Lake Kaweah; not just agricultural supply. At a minimum, turbidity measurements need to be evaluated to see if variations in levels persist and trends can be developed.

Item 12: The Monitoring Results Characterization section of the SAMR (page 6-15) states that, "*The results of the 2005 irrigation season indicate that improvements to current agricultural management practices are not warranted. Voluntary pesticide monitoring indicates that the extensive use of pesticides on the major crops within the Sub-watershed is not adversely impacting the water quality of the Kaweah River and its distributaries."*

A) Current agricultural practices have never been reported for farmers in the Kaweah River Sub-watershed despite the Conditional Waiver requirement to do so (page 5, paragraph 4 of the Monitoring and Reporting Program Order No. R5 –2003-0105). Additionally, Monitoring and Reporting Program Order No. R5 –2005-0833 requires that information must be collected from dischargers when sites are identified as toxic (statistically different form the laboratory control). The information includes the types of management practices that are being used, the degree to which they are being implemented within the watershed, and how effective they are in protecting waters of the state through all phases of monitoring.

B) The 2005 voluntary pesticide-monitoring program instituted by the Kaweah Sub-watershed included two sampling events (July and August); no pesticide analyses were reported as part of the storm season sampling. The voluntary pesticide-monitoring samples were analyzed for 11 nitrogen-phosphorus herbicides and two pesticides; no carbamates, organochlorines, or pyrethroids are included in the sampling program even though these compounds are extensively used in the Sub-watershed (Table 6-1 of the SAMR). An exception to the limited pesticide analysis is the data presented in the 17 May 2005 Communication Report where Dinoseb (0.36 µg/L), 2,4-D (1.1 µg/L), Bromacil (68 µg/L), and Diuron (160 µg/L) were listed as detections on the accompanying table.

C) A review of the Tulare County Agricultural Commissioners pesticide use database indicates that the vast majority of insecticides are applied from February to June. Materials applied in July and August (dates when the Sub-watershed conducted its pesticide sampling) are predominantly broadleaf herbicides.

D) The monitoring conducted by UC Davis for the Central Valley Water Board detected statistically significant toxicity to Fathead minnow at Button Ditch (20 June 2005) and Elk Bayou (21 June 2005), to Ceriodaphia at Elk Bayou (1 August 2005), and to Selenastrum at Elbow Creek on 29 January 2005. Chemical analysis conducted by UC Davis detected concentrations of chlorpyrifos, methidathion, simazine, diazinon, propargite, dimethoate, and bifenthrin in surface waters within the Kaweah River Sub-watershed.

Item 13: The conclusions and recommendations section of the SAMR lists 12 statements, a number of which Central Valley Water Board staff cannot support. A discussion of the disputed statements includes the following:

Statement 1: *The Kaweah & St. Johns River Association (Rivers Association) met sampling and testing obligations for the second year (2005) of Phase 1 monitoring under its approved Monitoring and Reporting Program (MRP) Plan.*

Staff Response: It is staff's observation that the Kaweah River Sub-watershed's MRP Plan states that sampling and testing for Phase 1 will begin in July 2004. Sampling will be conducted during the irrigation season, which is stated to be March through August, but may be as early as February and extend to October. Based on this description, 2005 irrigation season sampling should have started in March at the latest, not July. Additionally, see **Item 15** on page 9.

Statement 3: *Based upon the available Phase 1 monitoring results, water quality in the Kaweah River Sub-watershed is not being adversely impacted by agricultural management practices or discharges. Continued Phase 1 monitoring during the irrigation season in 2006 will provide additional data to further evaluate water quality and continue to provide a basis for more informed conclusions.*

Staff Response: It is Central Valley Water Board staff's conclusion that impacts due to agriculture in the Kaweah River Sub-watershed have been presented in the data submitted as part of the 21 February 2005 sampling event (See **Items 9 and 12 B**), and the UC Davis monitoring data (See **Item 12 D**). Additionally, potential impacts due to agricultural activities include the fathead minnow toxicity, which was reported for the 22 July 2004 sampling event.

The Kaweah River Sub-watershed's MRP Plan and the Monitoring and Reporting Program Order No. R5 –2005-0833 both state that Phase I sampling will be conducted for a period of two years. According to the Sub-watershed's SAMR, two years worth of irrigation season monitoring data have been collected. Phase II sampling should commence at the existing monitoring sites at the start of the 2006 irrigation season.

Statement 4: *The Rivers Association did not conduct a comprehensive monitoring effort for Phase 2 constituents. The Rivers Association did, however, conduct voluntary monitoring of a limited number of pesticides. The results suggest that agricultural practices are not adversely impacting water quality. The Rivers Association intends on resuming its voluntary Phase 2 monitoring efforts in 2006. Voluntary Phase 2 testing will continue until same is required by the Rivers Association's Waiver requirement.*

Staff Response: The voluntary pesticide-sampling program is discussed in **Issue 12 B & C**. Regarding the topic of agricultural impacts and the continuation of the voluntary Phase 2 sampling program, see staff's response to number 3 above.

Statement 5: *Basin Plan objectives for the Kaweah River continue to be achieved for most water quality parameters. There were no test results of the required Phase 1 constituent samples that did not achieve Basin Plan objectives.*

Staff Response: Basin Plan objectives were exceeded for toxicity, turbidity, color, and potentially fecal coliform bacteria. An additional note is the Diuron concentration of 160 ppb reported in the May 17 Communication Report that was above the USEPA health advisory of 21 ppb.

Statement 7: *Fecal coliform is monitored voluntarily by the River Association. The sample locations have experienced elevated fecal coliform levels. Septic tank systems provide the most likely source of this constitute, in lieu of agricultural runoff from irrigated crops.*

Staff Response: This hypothesis must be supported with data. Confined animal facilities, birds, wildlife, irrigated pasture, and applied fertilizers are also potential sources.

Statement 8: *Location SP-3 is currently the only sample location that is experiencing some degree of variability in its water quality. More data is needed to establish conclusions regarding this area of the Sub-watershed.*

Staff Response: See UC Davis monitoring data that is discussed in **Item 12 D**.

Statement 9: *The monitoring results continue to indicate that current agricultural practices involving pesticides, water, vegetation, and soils management are effective in minimizing water quality impacts resulting from irrigated lands. No improvements or changes have been identified or are recommended at this time.* The 17 May 2005 Communication Report that documented 0% survival to Ceriodaphnia states, *"From a follow-up procedural standpoint, in addition to addressing the laboratory related issues, we will be soon meeting with the Board of Directors of the Stone Corral Irrigation District. We will be discussing not only the test results, but the nature of their project and potential permitting alternatives relative to the same. We will also be addressing the issue of contributory areas outside of the District to the discharge location and discharge characteristics, as well as permitting alternatives."*

Staff Response: The Conditional Waiver requires that when monitoring results indicate that water quality objectives are exceeded in the surface waters of the Coalition Group area, the Coalition Group shall submit a Communication Report describing how it will evaluate the effectiveness of one or more management practice(s) at preventing discharge of constituents of concern to surface waters. The exceedance occurred but no on-farm management practices have been assessed.

Statement 10: *Sediment toxicity results showed significant improvement, suggesting that non-agricultural land uses impacted previous results.*

Staff Response: Only one sediment-sampling event was performed during the 2005 SAMR and only three sediment-sampling events have been conducted since the program was started. The conclusion that non-agricultural land uses impacted previous results is at best premature. As the Kaweah River Sub-watershed pointed out in comment 8 of their conclusions and recommendations section, *more data is needed to establish conclusions regarding this area of the Sub-watershed.*

Statement 12: *The information and data, evaluation, conclusions, and recommendations complied in this Report meet the MRP Plan objectives for the Kaweah River Sub-watershed.* According to the Kaweah River Sub-watershed's MRP Plan, a pesticide use

evaluation was to be performed. *"Changes in pesticide concentrations at specific sampling points will be compared to pesticide use patterns in land areas upstream of the sampling points."*

Staff Response: No pesticide use evaluation was included in the SAMR. MRP Plan required management practice effectiveness and implementation tracking was not conducted. Copies of field data sheets and laboratory originals were not included in an appendix as required. MRP Plan required re-sampling was not conducted when necessary. Flow monitoring appears to have been conducted by indirect estimation rather than the MRP Plan required sampling point flow measurement. It is unknown if TIE and dilution series were conducted when required as described in the Kaweah River Sub-watershed's MRP Plan.

CONDITIONAL WAIVER COMPLIANCE

Certain aspects of the Conditional Waiver program may not have been completely addressed in the Watershed Evaluation, QAPP, and MRP Plan, and subsequently, were not included in the SAMR. While these documents have received prior approval by the Board, it is staff's position that additional information and/or actions should be undertaken at this time in order to fully comply with the **Conditional Waiver** program. These actions include: increasing the number of sampling points; the frequency of sampling; and actions taken to address water quality impacts.

Item 14: Monitoring and Reporting Program Order No. R5-2003-0105 (pages 8 and 10) states that the number of monitoring sites shall be based on acreages and watershed characteristics sufficient to allow for the calculation of load discharged for every waste parameter. Additionally, all major drainages must be part of baseline monitoring. At least 20% of the intermediate drainages must be monitored during the first year and the second 20% the second year, etc.

A) The Watershed Evaluation Report for the Kaweah River did not specify the major and intermediate drainages that exist within the Sub-watershed. Due to this discrepancy, a reliable calculation of the 20% of the intermediate drainages to be monitored each successive year cannot be made.

B) The Kaweah River Sub-watershed SAMR and revised MRP Plan propose to add two additional monitoring points: one on Elk Bayou, and one on Goshen Ditch. These points were proposed to address staff's comments (letter dated 3 August 2005) to the Sub-watersheds 1 April 2005 Annual Monitoring Report. The Kaweah River Sub-watershed responded to the Water Boards request in a letter dated 26 September 2005. The letter described potential impacts from the Cities of Visalia, Tulare, Exeter, and Farmersville and concluded that because of these potential impacts, no monitoring points would be established down gradient of these regions. The two newly proposed sampling points (Elk Bayou and Goshen Ditch) are to be situated east of Highway 99. Additionally, a revised location for monitoring point SP-4 was presented in the SAMR on Table 1; no discussion was presented in the text (revised SP-4 location has been moved back to the east, further upstream). Water Board staff pointed out in the 3 August 2005 letter that

the majority of irrigated agriculture is located south of the City of Visalia and west of Highway 99. That area was not, and is still not, being monitored. While staff agrees that potential non-agricultural impacts exist (cities, septic tanks, airports, golf courses, etc), testing must still be performed down gradient of farming activities to evaluate the extent of agricultures impacts, if any

Item 15: The frequency of sampling set forth in the Conditional Waiver program is once a month during the irrigation season and twice during the storm season. The irrigation season is when farmers (individuals for whom the Waiver Program was developed) are utilizing either surface or ground water to pre-irrigate, irrigate, or post-irrigate fields. The irrigation season is not just when water districts, irrigation districts, or canal companies are making water deliveries.

Item 16: When toxicity is discovered, re-sampling is to be performed and samples are to be collected upstream to aid in determining the limits of toxicity. The Kaweah River Sub-watershed Communication Report for the 21 February 2005 sampling event does not contain any information regarding re-sampling or sampling upstream in response to the detected toxic event (statistically significant mortality to Selenastrum).

Item 17: Communication Reports are to be promptly submitted to the Water Board whenever a water quality exceedance occurs. In the case of the 21 February 2005 sediment-sampling event, the required Communication Report was not submitted to the Water Board until 17 May 2005 (approximately three months after the sample was collected and one month after receipt of the analytical data). The Conditional Waiver requires that when monitoring results indicate that water quality objectives are exceeded in the surface waters of the Coalition Group area, the Coalition Group shall submit a Communication Report describing how it will evaluate the effectiveness of one or more management practice(s) at preventing discharge of constituents of concern to surface waters. The selection of management practice evaluation projects shall include consideration of the contribution of target constituents of concern to known water quality impairments, potential application of the management practices over a broad geographic area and large spectrum of crops, and ease and immediacy of possible implementation. An evaluation of management practices was not performed for either of the Communication Reports that were submitted in 2005 (17 May 2005 and 22 September 2005).

Item 18: Problems with instructions/communications between the Kaweah River Sub-watershed and its contract laboratories were observed as part of the SAMR review. A TIE and potentially a dilution series were required to be performed on the storm water sample (SP-3, Stone Corral) collected on 21 February 2005. The Communication Report submitted for this sample states that "*We have contacted our testing laboratory to ensure that the TIE procedures were being followed, but have been unable to confirm that fact to date."* No additional information regarding this subject has been submitted to the Central Valley Water Board and it is assumed that a TIE was not conducted. The Kaweah River Sub-watershed needs to ensure that its contract laboratories clearly understand the requirements of the program and agree to implement them when required. Additionally, the contract laboratories need to be directed to verbally notify the Sub-watershed as soon as statistically significant toxicity is observed no matter what the perceived cause. The

problem with potential predators being present in the sediment sample collected on 28 November 2005 could, and should have been corrected by re-running the sample, or requesting a re-sample. The Sub-watersheds decision not to involve the Central Valley Water Board when the situation was first encountered further compounded the problem. Clear lines of communication need to be established between the laboratory, the Sub-watershed, and the Central Valley Water Board.

Issue 19: Monitoring and Reporting Order No. R5-2005-0833 requires that two sediment samples be collected per year: one during the irrigation season, and one during the storm season. The SAMR sediment sample was actually collected in during the storm season (20 November 2005). No irrigation season sediment sample was collected.